

## Virginia Community College System Digital Commons @ VCCS

---

Student Writing

Student Scholarship and Creative Works

---

Spring 2017

# Assessment of Sea Level Rise in Middlesex County and Its Influence on Future Storm Surges and Waterfront Property

Jason Chen

*Rappahannock Community College*

Follow this and additional works at: [https://commons.vccs.edu/student\\_writing](https://commons.vccs.edu/student_writing)



Part of the [Earth Sciences Commons](#), and the [Environmental Sciences Commons](#)

---

### Recommended Citation

Chen, Jason, "Assessment of Sea Level Rise in Middlesex County and Its Influence on Future Storm Surges and Waterfront Property" (2017). *Student Writing*. 21.

[https://commons.vccs.edu/student\\_writing/21](https://commons.vccs.edu/student_writing/21)

This Paper is brought to you for free and open access by the Student Scholarship and Creative Works at Digital Commons @ VCCS. It has been accepted for inclusion in Student Writing by an authorized administrator of Digital Commons @ VCCS. For more information, please contact [tcassidy@vccs.edu](mailto:tcassidy@vccs.edu).

## **Abstract**

There is currently an upward trend of sea level rise in the Chesapeake Bay region and many other areas around the world. Sea level rise in itself is a major impact on the environment and humans, and it has become a factor in the severity of other natural disasters like hurricanes. With increasing sea level rise, storm surges are much higher, and together with wind driven waves will cause more destruction to the coast. The 1933 hurricane was considerably stronger than Hurricane Isabel, creating record high tide level from storm surge, but because of the 42.7 cm increase in average tide level over the next 70 years, Hurricane Isabel comparatively seemed equal in power to the 1933 hurricane. Using the 2016 Middlesex County Geography Information System, land value of both waterfront and inland properties were taken and recorded, along with the amount of acreage that is associated with the value. Using the sea level trend data from NOAA, graphs were created that modeled actual tide level from historic hurricanes with the addition of projected sea level rise for Middlesex County, Virginia. The mean hurricane water level is estimated to rise from 98.01 cm to 111.38 cm, with a projected sea level increase of 13.37 cm in 30 years. Data show that at all three locations waterfront properties were statistically much more valuable compared to inland property values. Waterfront property owners should be aware of how much more susceptible their property is to flooding due to future sea level rise. Increases in development along the shorelines raises vulnerability of infrastructure, and changes in city planning are essential to mitigate the effects of floods and erosion.

## Introduction

There is currently an upward trend of sea level rise in the Chesapeake Bay region and many other areas around the world. Since the late 19<sup>th</sup> century, sea level measurement gauges have determined an average increase of  $1.7 \pm 0.3$  millimeters per year. By the 1990s, precise satellite measurements now gauge the sea level rise with an average increase of  $3.3 \pm 0.4$  millimeters per year (Nicholls et al., 2014). Sea level rise in itself is a major impact on the environment and humans, and it also stressed the severity and frequency of other natural disasters. One case of such impact are storm surges. Hurricane storm surges are caused by the low atmospheric pressure in the center of the hurricane, uplifting the water below and driving it toward shore with land falling storms. With increasing sea level rise, storm surges are much higher, thus stronger, and together with wind driven waves will cause increasing destruction to the coast (Kleinosky et al., 2006). With climate change and elevated sea level rise, hurricanes, storm surges, and floods will have increased wave energy, a higher risk for occurrence, and cause greater damage to coastal communities (Reay, 2011).

In 1933 a hurricane, commonly recognized as the “storm of the century” for the Chesapeake Bay, produced a storm surge in Hampton Roads that parallels with Hurricane Isabel’s maximum tide level. The 1933 hurricane and Hurricane Isabel both produced a peak tide level of just under 250 centimeters above the mean lower low water (Boon et al., 2016). The 1933 hurricane was considerably stronger than Hurricane Isabel, creating record high tide levels from storm surge, but because of the 42.7 centimeter increase in average tide level over the next 70 years, Hurricane Isabel comparatively seemed equal in power to the 1933 hurricane (Tompkins et al., 2014).

In recent decades, there has been intense development along coastal shorelines of the mid-Atlantic and Chesapeake Bay region (USGS, 2016). Population in the Virginia coastal zone has increased over 1.6 million people over the past 30+ years and coastal counties now have the highest population density in the state (NOAA, 2004). There has been a 48% increase in the coastal population since 1980, this increase in coastal population is parallel with increase in land development, and those properties are threatened by changing shorelines due to rising sea level (USGS, 2016). Future increases in development along coastal shorelines is risky due to the vulnerability to flooding and erosion, and can result in significant economic loss for the affected counties.

Studies have shown that property values have a correlation with distance from the water. Although not all studies yield the same result, a mass of those studies have presented data that properties close to or overlooking the water has a higher value compared to properties that are farther away from the water (Dumm et al., 2014). In a study of assessing changes in waterfront value over long periods, the study shows that there has been an “up and down” cycle in waterfront properties; such a pattern was visible from 1990 to 2009, with the rise and fall alternating every few years (Hansen et al., 2013).

The purpose of this research project is to create a prediction of how current sea level rise trends combined with storm surges will impact waterfront properties into the future. Sea level rise has been widely accepted, and this project will use tide level data to further verify the occurrence of such phenomenon. This study is based on how sea level rise combined with storm surge and tides will impact not only the waterfront properties, but also the economies of the county surrounding the surveyed area. This project will use published NOAA data of observed peak tide level during past hurricanes to predict the effects of elevated sea levels on future storm

surges. Using the published current local rate of sea level rise, added to the peak of observed tide level during past hurricanes, a model for the future was created of how much higher the tide level could occur in future hurricanes. Property data was collected for all three sites with two categories each, waterfront and inland values. Comparison was made between the two categories to show variance in value.

### **Hypotheses**

**Ha1:** If there is an increase in sea level rise, then it will create higher tide level during hurricanes.

**Ho1:** If there is an increase in sea level rise, then it will not have any effect on tide level during hurricanes.

The independent variable in this study is the past hurricane observed water level and the dependent variable is predicted water level rise due to sea level. Constants are the data collection and analysis methods and source of data from NOAA.

**Ha2:** If the property is on or overlooking the water, then its value will be higher than those that are inland.

**Ho2:** If the property is on or overlooking the water, then its value will be not be different to those that are inland.

The independent variable is the distance from the shoreline and the dependent variable is the value of the property. The constants are the database of values from Middlesex County and the acreage of each property assessed was constant.

### **Materials and Methods**

Due to lack of data for Middlesex County tide level, nearby Windmill Point was chosen for its close proximity to Middlesex County (Figure 1). Using stations from the Nation Oceanic and Atmospheric Administration (NOAA), the peak tide levels during 11 hurricanes that affected

Virginia of varying dates and category were taken and recorded. Then using the sea level trend data, also from NOAA, graphs were created with the addition of sea level rise that modeled how the tide level of the hurricanes would be if they were to occur years later.

The three sites chosen for the study of property values are within Middlesex County, Virginia: Deltaville, Water View, and Urbanna (Figure 1). Data collection for all three sites were divided into two categories, waterfront and inland. 30 data points were randomly chosen for each category, producing a total of 180 data points. Using the 2016 Middlesex County Geography Information System, land value of both waterfront and inland properties were taken and recorded, along with the amount of acreage that is associated with each value. Analysis derived the value of one acre for all 180 data points, then for each category the mean value of one acre of land with structures was averaged and compared within its respective site.

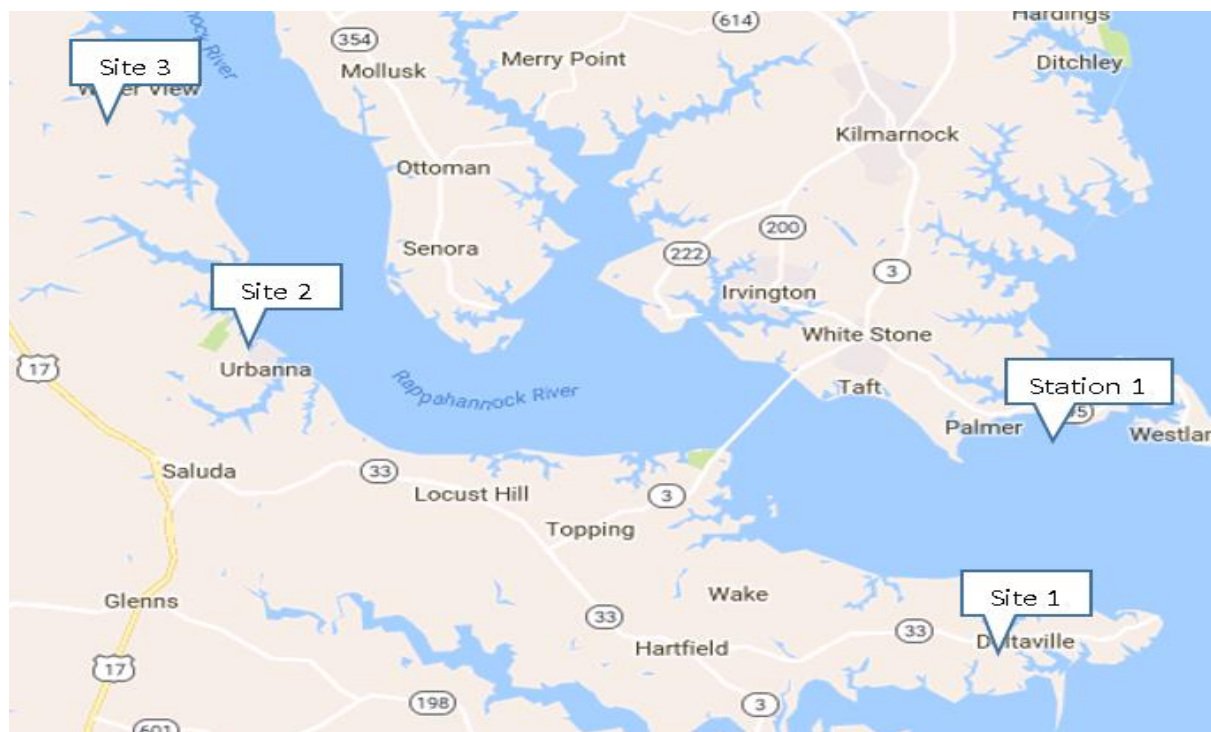


Figure 1. Site 1 located at Deltaville; Site 2 located at Water View; Site 3 is located at Urbanna, Virginia. Station 1 is located across the Rappahannock at Windmill Point, Virginia.

## Results

Eleven major hurricanes that have impacted the Middlesex County were analyzed based on the amount of water level rise that was experienced and average sea level rise 0.44 mm/year was superimposed on the sea level rise data (Figures 2 and 3). The resulting graphs are an indication of potential combined effected of hurricane flooding and sea level rise effects in the future 30 years. The mean hurricane water level rise is estimated to go from 98.01 cm to 111.38 cm, an increase of 13.37 cm. Thirty years into the future, the residents of Middlesex county should expect to experience an average hurricane flood level of 110 cm in tide level.

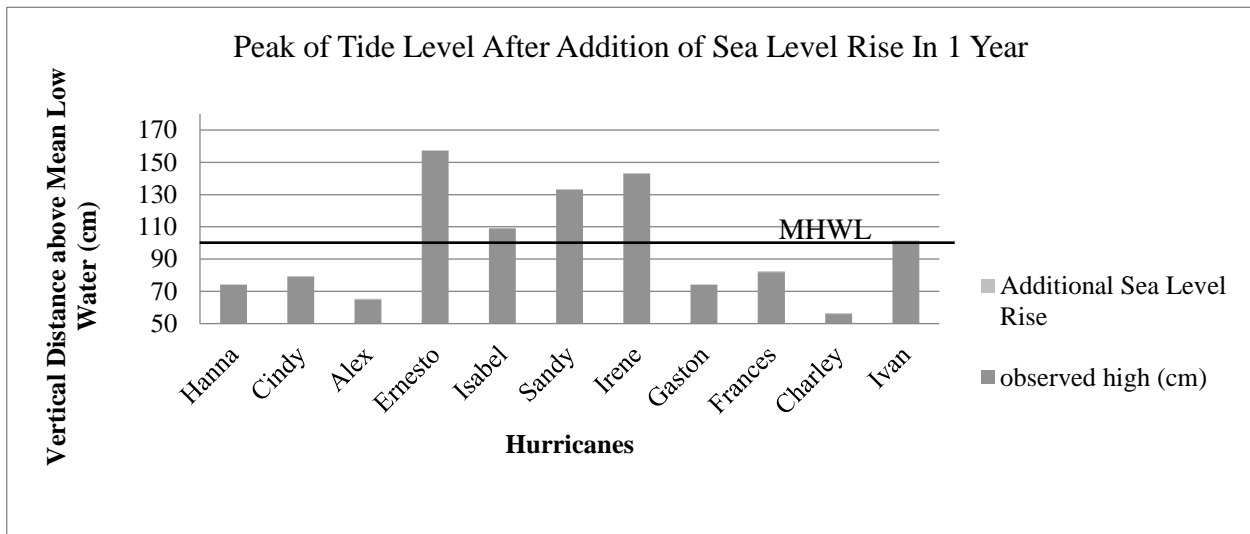


Figure 2. Peak of Tide Level After Addition of Sea Level Rise in 1 Year. Hurricane tide level above MLW (cm), from left to right; 74.461, 79.461, 65.461, 157.461, 109.461, 133.461, 143.461, 74.461, 82.461, 56.461, 101.461. The Mean Hurricane Water Level is 98.01 cm.

Three different locations of Middlesex County were selected to collect land value data, with each location differentiated by waterfront and inland values (Figure 4). Data at all three locations of waterfront properties were statistically much more valuable compared to inland property values. T-test analysis of these values yielded  $p=2.419\text{E-}13$ ;  $1.150\text{E-}7$ ; and 0.0001.

Deltaville's waterfront value is 721% of inland value; Water View's waterfront value is 382% of inland value. Urbanna's waterfront value is 190% of inland value.

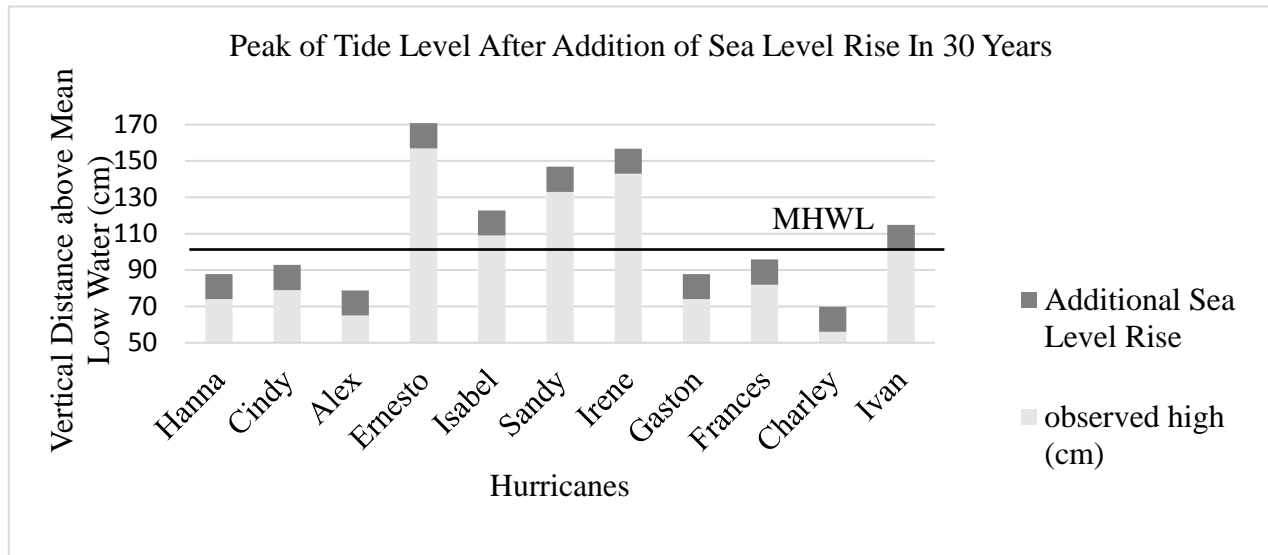


Figure 3. Peak of Tide Level After Addition of Sea Level Rise in 30 Years. Hurricane tide level above MLW (cm), from left to right; 87.83, 92.83, 78.83, 170.83, 122.83, 146.83, 156.83, 87.83, 95.83, 69.83, 114.83. The Mean Hurricane Water Level is 111.38 cm.

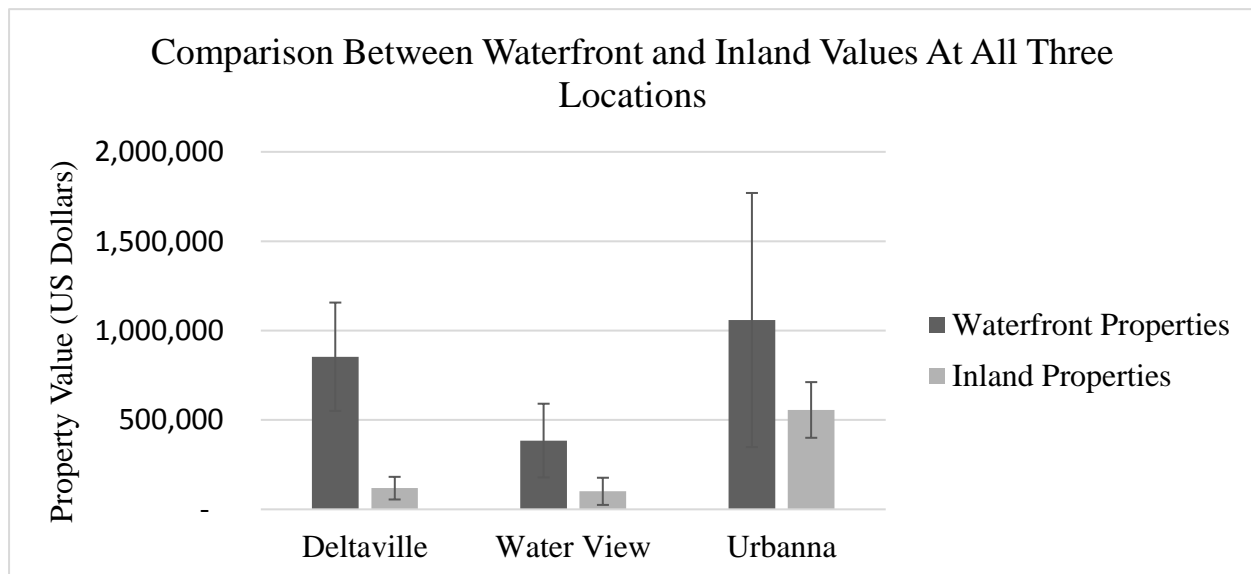


Figure 4. Property value comparisons at three locations in Middlesex County. Deltaville waterfront is 721% higher; Water View is 382% higher, and Urbanna is 190% higher in value. T-test  $p < 0.05$  for all t-test statistical comparisons of waterfront and inland values. ( $p = 2.419E-13$ ;  $1.150E-7$ ; and  $0.0001$  respectively).



## Conclusion

Based on the results for property values compared between the waterfront and inland areas of the county, the data show a statistically significant difference between the two categories at all three sites,  $p < 0.05$ . Therefore, the null value hypothesis: If the property is on or overlooking the water, then its value will be not be different to those that are inland is rejected,  $t$ -test  $p = 9.53E-06$ . For tide level, the height of tide level data modeled for thirty years into the future showed increased height for the eleven hurricanes.

This study has been parallel with a similar study done regarding tide level and waterfront properties. Though the value of waterfront properties has an alternating cycle, it is consistently greater in value compared with nearby inland property values (Hansen et al., 2013; Dumm et al., 2014). Waterfront property owners should be aware of how their land is much more susceptible to future flooding. Data show that the mean hurricane water level (MHWL) of past hurricanes is at 98cm, but after 30 years the MHWL has risen to 110cm, which will result in more frequent and severe flooding. By 2003, 48% of Virginia population is living in coastal communities. Increase in development along the shorelines raises vulnerability of numerous infrastructures, and changes in planning are essential to mitigate the effects of future floods and keep its resulting erosion to the minimum. By doing so, those waterfront properties and infrastructures can help its community to achieve a more secure county tax base income into future years. The Virginia Coastal Zone Management Program has encouraged the development of living shorelines as opposed to the hardened shorelines. The living shorelines has beneficial value to water quality and habitats, and allows the wetlands to move up land as sea level rises (VCZMP, 2016).

Further studies for this project can increase sample locations to increase confidence level of accuracy of data. More station's data should be collected to confirm increasing trends of sea level rise, and factoring in tide level during other events other than hurricanes to examine alternate impacts of sea level rise. The sea level rise used here is based on the average observed values, if the rate of rise were to increase, the results would potentially be far worse.

## Work Cited

### Peer-reviewed:

Dumm, R. E., Sirmans, G. S., and Smersh, G. T. (2014, November). Price Variation in Waterfront Properties Over the Economic Cycle.  
<<http://pages.jh.edu/jrer/papers/pdf/forth/accepted/Price%20Variation%20in%20Waterfront%20Properties%20Over%20the%20Economic%20Cycle.pdf>>

Kleinosky, L. R., Yarnal, B., and Fisher, A. (2006, January 8). Vulnerability of Hampton Roads, Virginia to Storm-Surge Flooding and Sea-Level Rise.  
<<http://www.ccpo.odu.edu/~atkinson/ODUResearch/papers/Vulnerability%20of%20Hampton%20Roads,%20Virginia.pdf>>

Nicholls, R. J., and Cazenave, A. (2010, June 18). Sea-Level Rise and Its Impact on Coastal Zones.  
<<ftp://128.171.151.230/coastal/Climate%20Articles/Sea%20level%20review%20Science%202010.pdf>>

Tompkins, F., and Deconcini, C. (2014, June). Sea Level Rise and Its Impact on Virginia.  
<[https://www.wri.org/sites/default/files/wri\\_factsheet\\_virginia\\_final.pdf](https://www.wri.org/sites/default/files/wri_factsheet_virginia_final.pdf)>

Virginia Coastal Zone Management Program Coastal Enhancement Strategies. January 2016. Virginia CZM Program Coastal Needs Assessment and Strategies: FY2016-2020. P.9  
<<http://www.deq.virginia.gov/Portals/0/DEQ/CoastalZoneManagement/FundsInitiativesProjects/section309VACZM2016-2020needsassessandstrategies.pdf>>

### Non-peer-reviewed:

Boon, J., and Emeritus. (2016). The Three Faces of Isabel.  
<[http://www.vims.edu/research/units/labgroups/faces\\_of\\_isabel/index.php](http://www.vims.edu/research/units/labgroups/faces_of_isabel/index.php)>

Nix, G. (2016). County View 2016. Retrieved from  
<[http://www.co.middlesex.va.us/county\\_viewer2016.html](http://www.co.middlesex.va.us/county_viewer2016.html)>

Reay, W. G. (2011, September). Sea Level Rise: Local Fact Sheet for the Middle Peninsula, Virginia.  
<[http://www.vims.edu/cbnerr/\\_docs/ctp\\_docs/MPPDC%20Sea%20Level%20Rise%20Fact%20Sheet%20FINAL%202011.pdf](http://www.vims.edu/cbnerr/_docs/ctp_docs/MPPDC%20Sea%20Level%20Rise%20Fact%20Sheet%20FINAL%202011.pdf)>

Theieler, R., & Hapke, C. (2016, December 5). National Assessment of Shoreline Change Project.

<<https://coastal.er.usgs.gov/shoreline-change/>>

Water Levels - NOAA Tides & Currents.

<<https://tidesandcurrents.noaa.gov/waterlevels.html?id=8636580>>

## Appendix A: Sea Level Rise

### Windmill Point, VA

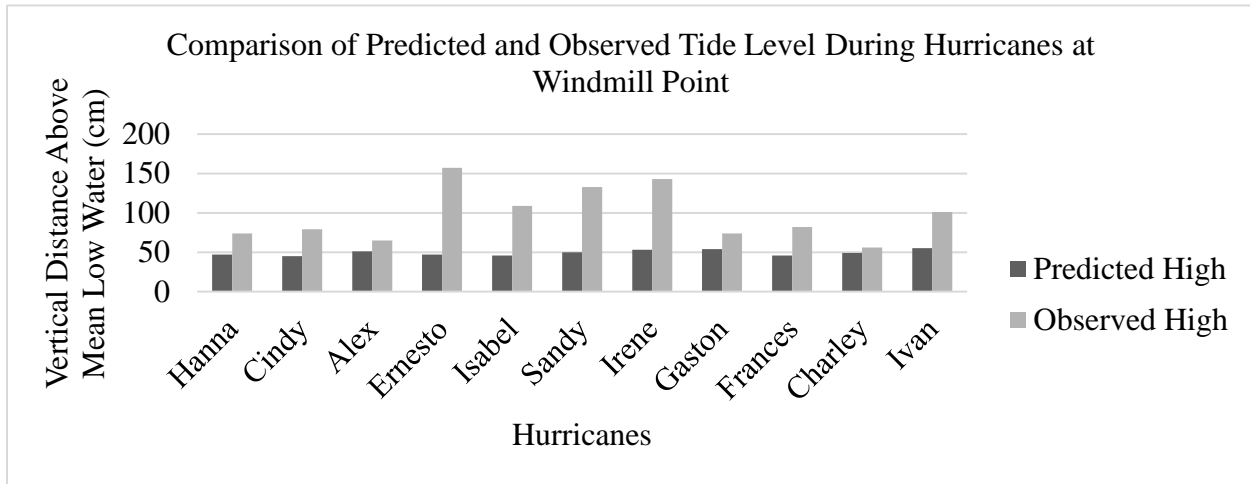


Figure 5. Comparison of predicted and observed tide level during 11 varying categories of hurricanes at Windmill Point.

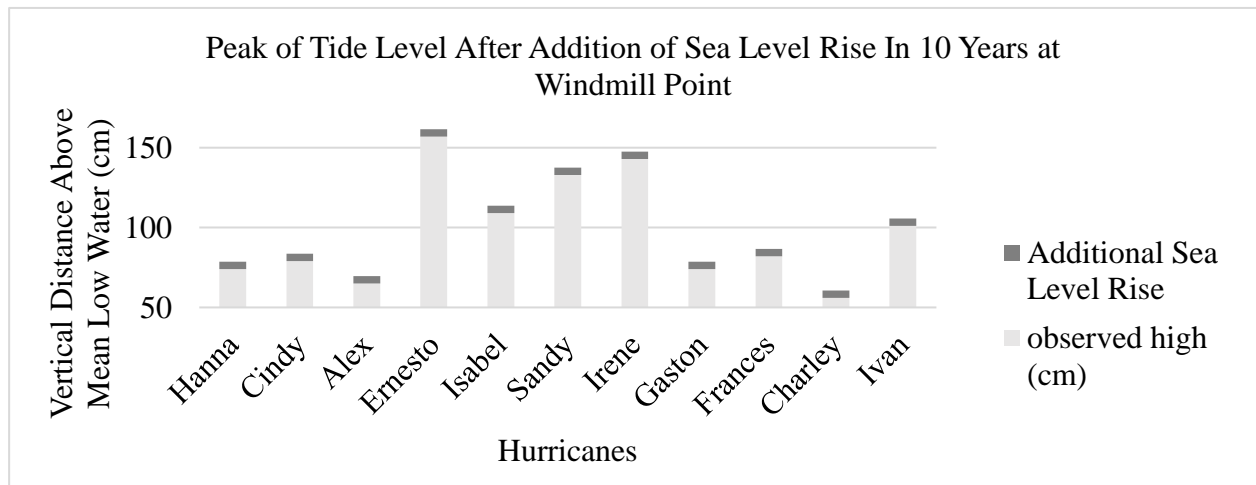


Figure 6. Peak of tide level after addition of sea level rise to previous recorded tide levels of hurricanes in 10 years.

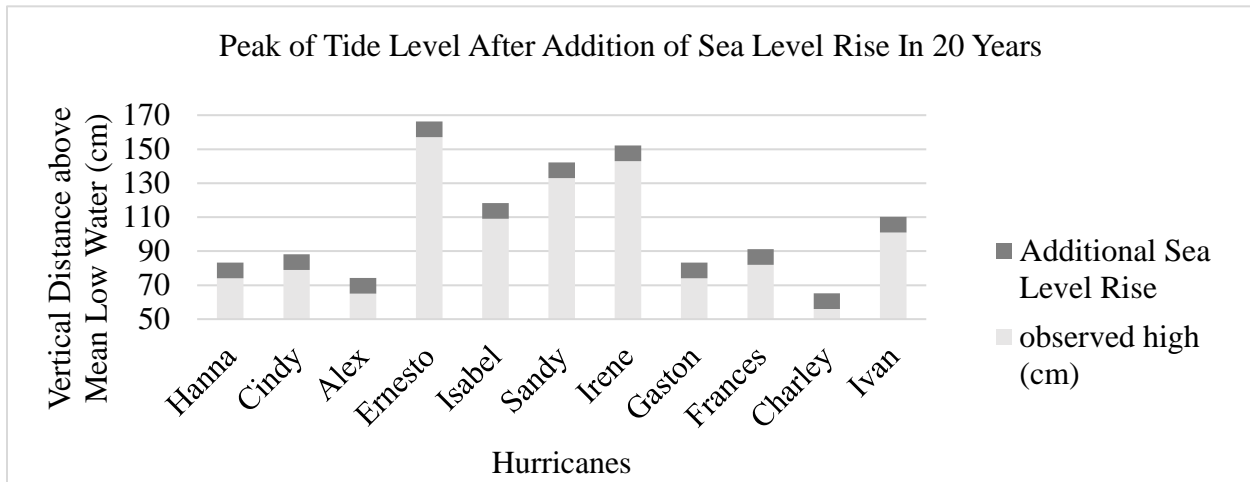


Figure 7. Peak of tide level after addition of sea level rise to previous recorded tide levels of hurricanes in 20 years.

**Kiptopeke, Virginia**

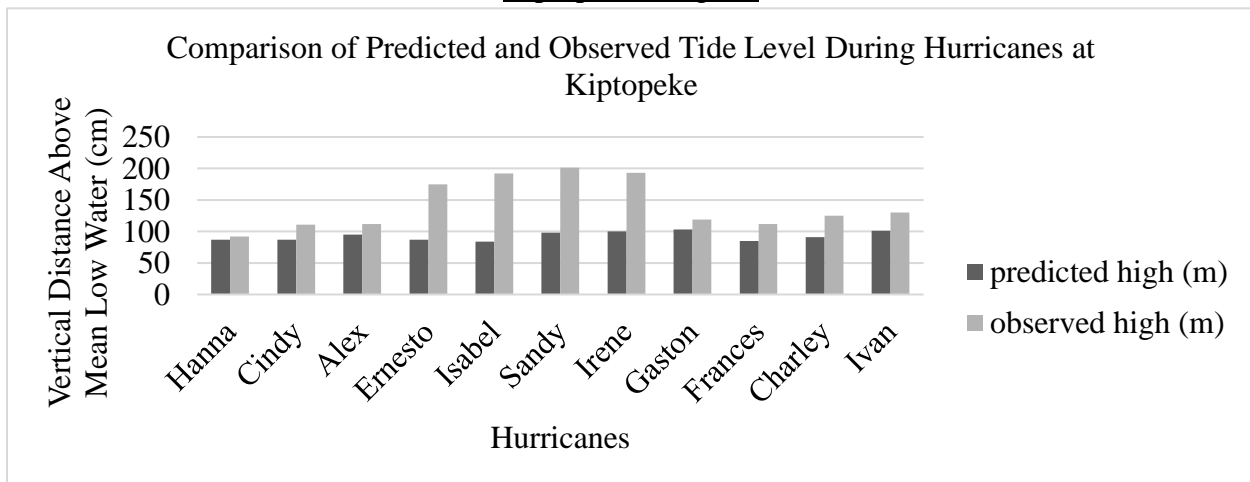


Figure 8. Comparison of predicted and observed tide level during 11 varying categories of hurricanes at Kiptopeke.

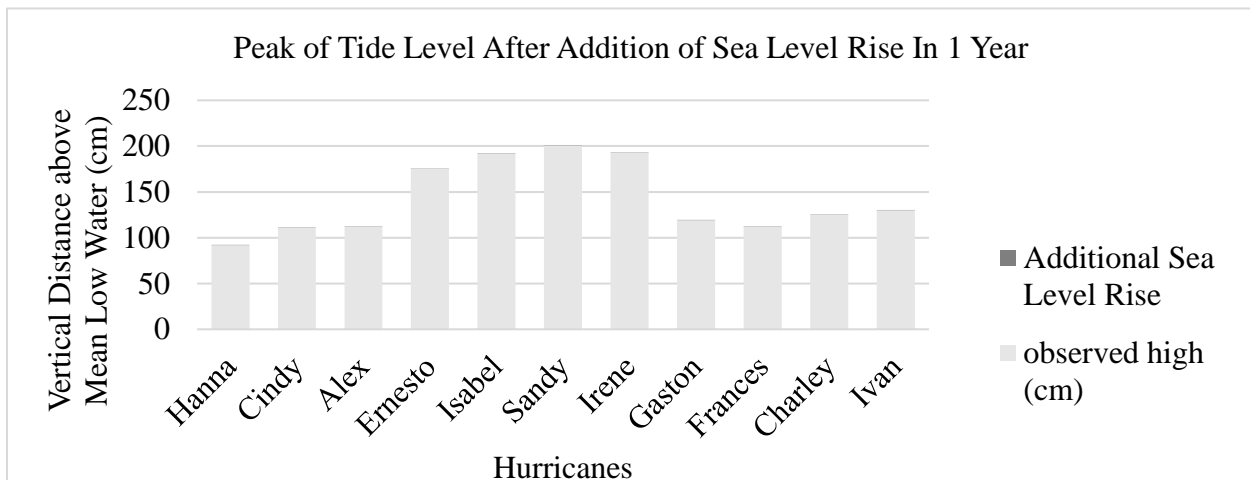


Figure 9. Peak of tide level after addition of sea level rise to previous recorded tide levels of hurricanes in 1 year.

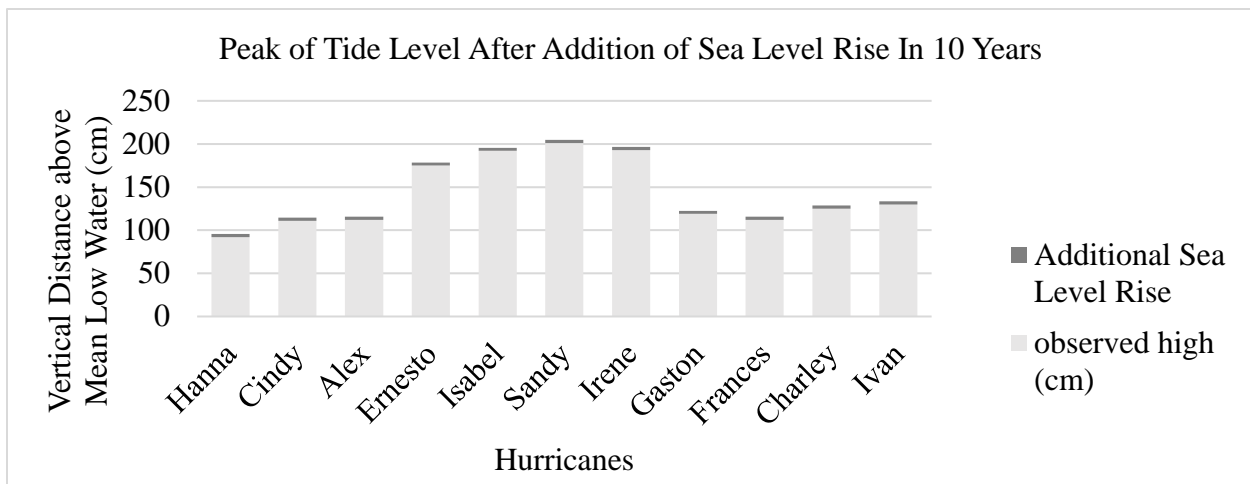


Figure 10. Peak of tide level after addition of sea level rise to previous recorded tide levels of hurricanes in 10 years.

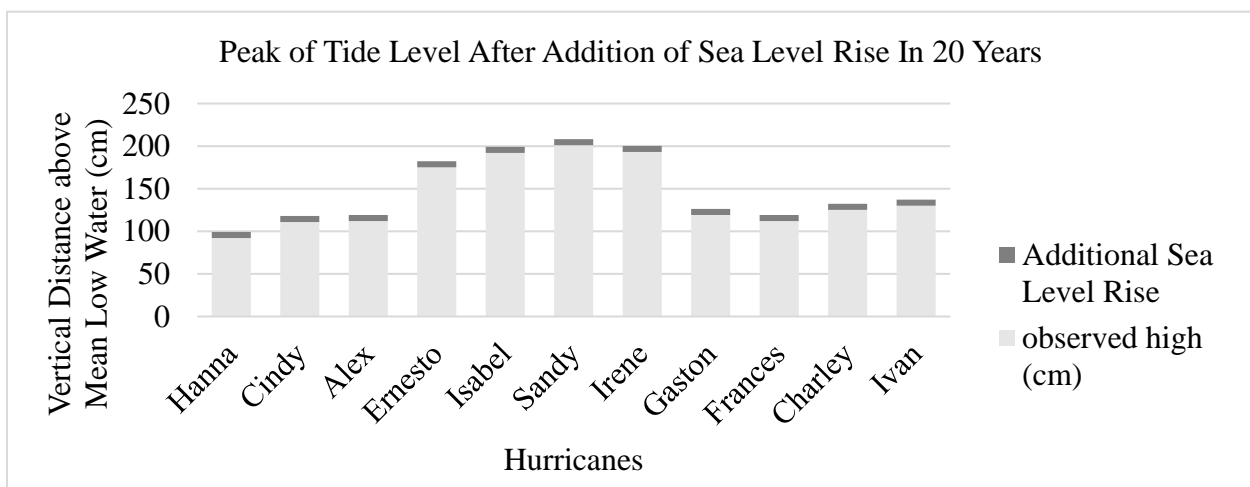


Figure 11. Peak of tide level after addition of sea level rise to previous recorded tide levels of hurricanes in 20 years.

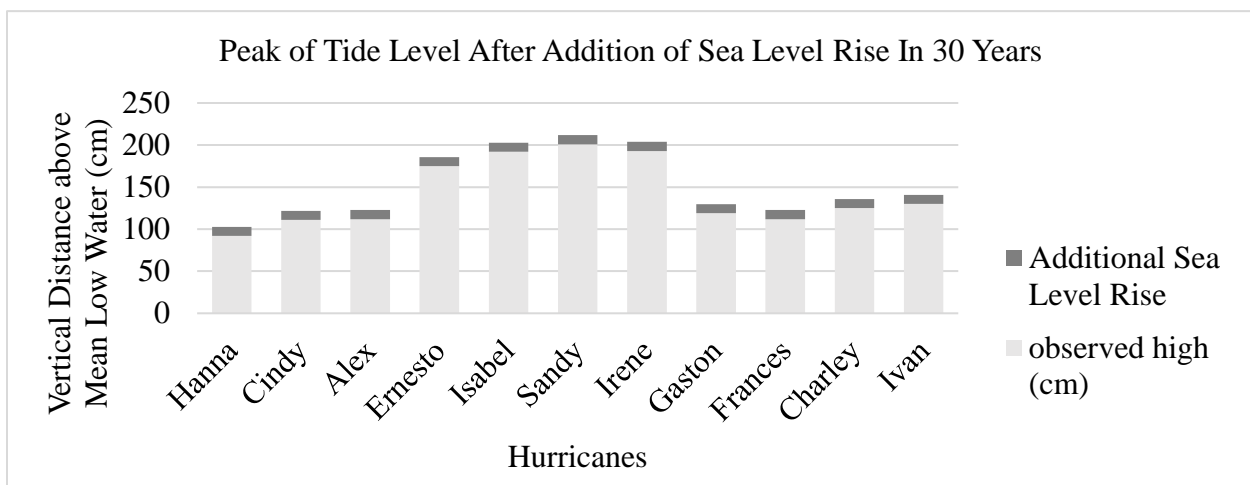


Figure 12. Peak of tide level after addition of sea level rise to previous recorded tide levels of hurricanes in 30 years.

### Chesapeake Bay Bridge Tunnel

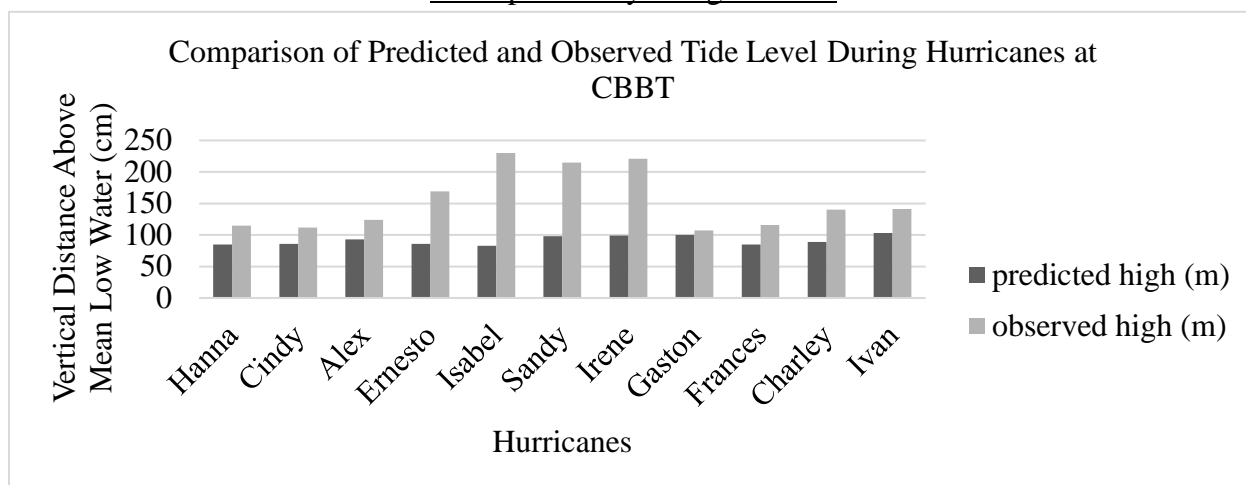


Figure 13. Comparison of predicted and observed tide level during 11 varying categories of hurricanes at Chesapeake Bay Bridge Tunnel.

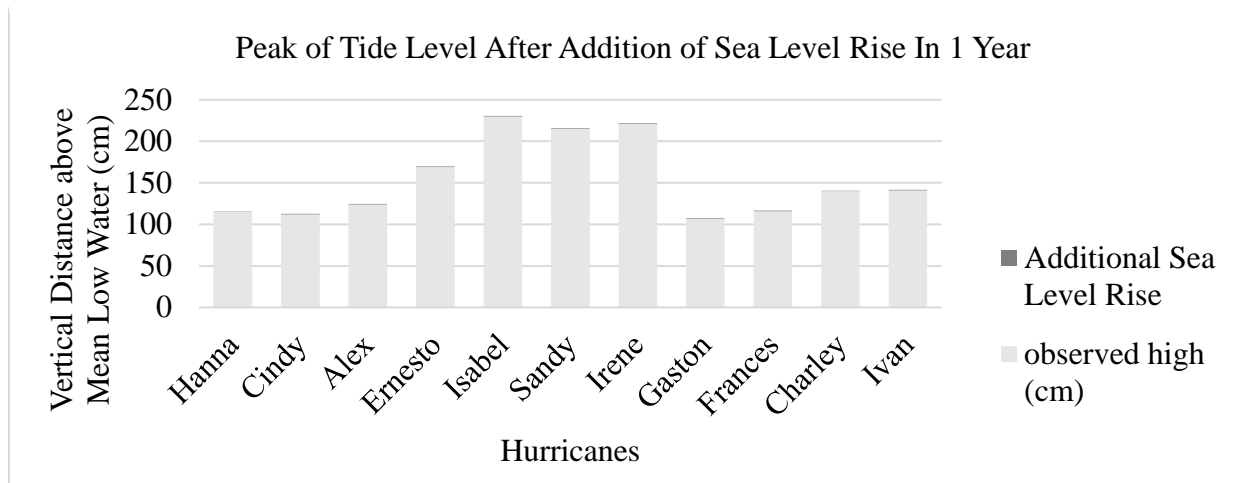


Figure 14. Peak of tide level after addition of sea level rise to previous recorded tide levels of hurricanes in 1 year.

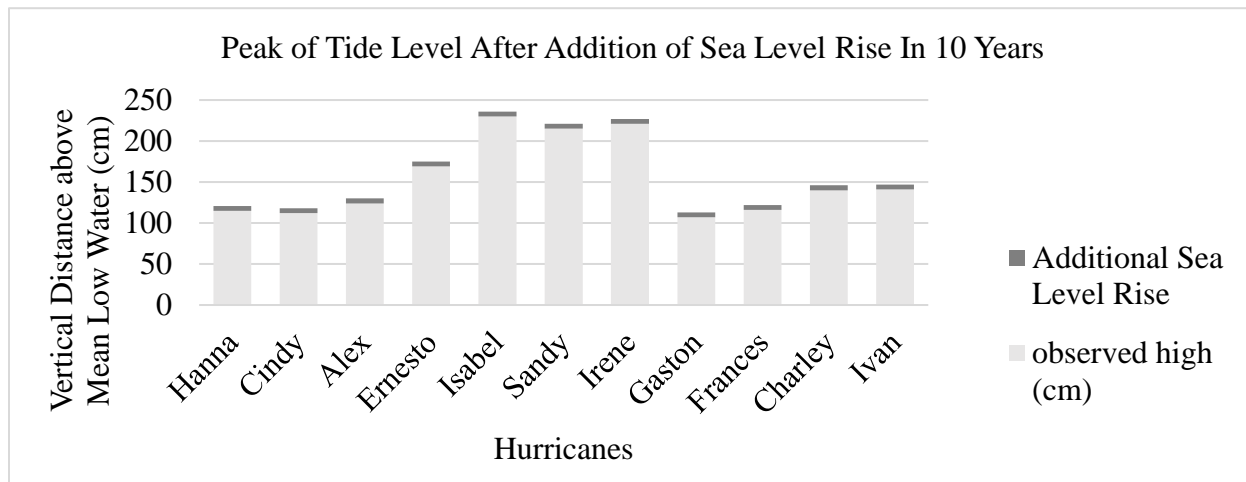


Figure 15. Peak of tide level after addition of sea level rise to previous recorded tide levels of hurricanes in 10 years.



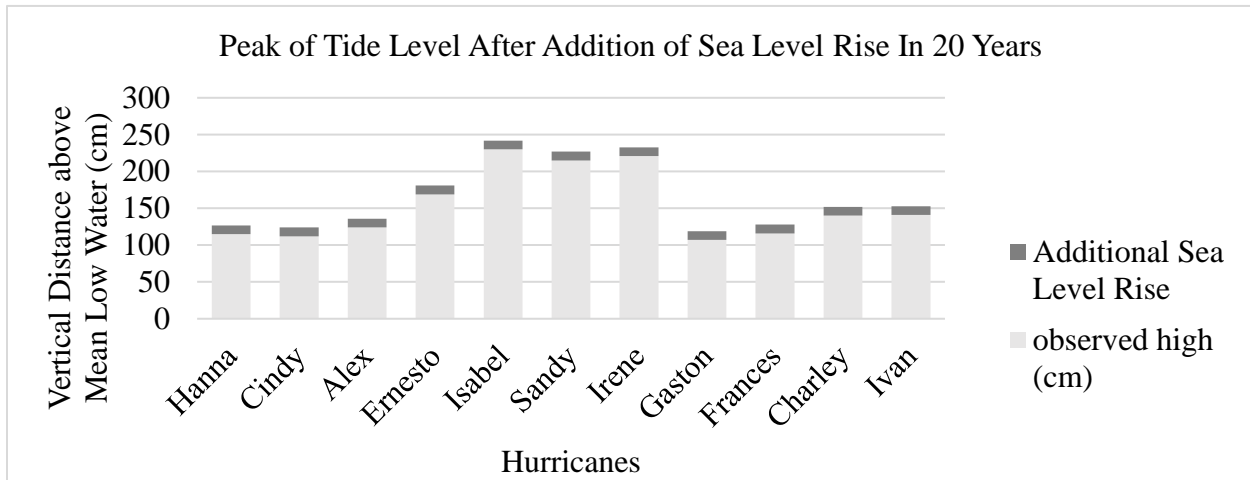


Figure 16. Peak of tide level after addition of sea level rise to previous recorded tide levels of hurricanes in 20 years.

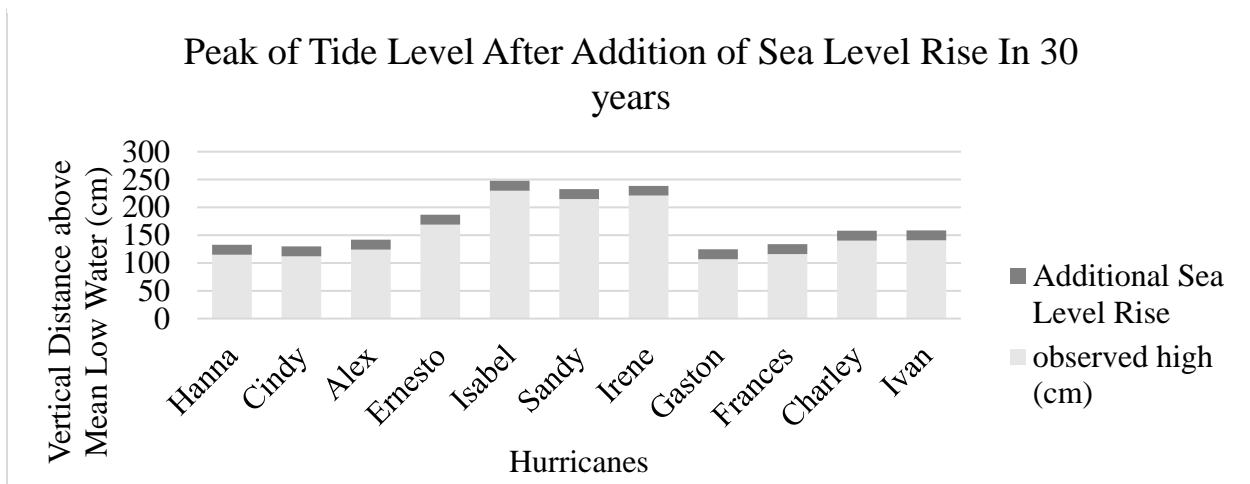


Figure 17. Peak of tide level after addition of sea level rise to previous recorded tide levels of hurricanes in 30 years.

## Appendix B: Property Value

Deltaville (Waterfront)							
Map #	Value	actual acre	calculated 1 acre value	Map #	Value	actual acre	calculated 1 acre value
41 68	617,100	1.1	561,000	46 6 56	610,400	0.86	709,767
46 2 1	657,800	0.75	877,067	46 6 57	588,700	0.8	735,875
46 2 15	587,900	1	587,900	46 6 58	484,500	0.8	605,625
46 2 17	553,000	1	553,000	46 7 59	456,000	0.8	570,000
46 2 18	784,500	1	784,500	46 7 60	621,200	0.8	776,500
46 2 19	703,000	0.79	889,873	46 7 61	650,600	0.7	929,429
46 2 20	688,600	0.8	860,750	46 7 62	463,700	0.8	579,625

<b>46 2 21</b>	817,800	0.8	1,022,250	<b>46 7 63</b>	478,600	0.61	784,590
<b>46 2 22</b>	639,700	0.83	770,723	<b>46 7 64</b>	742,100	0.81	916,173
<b>46 2 25</b>	564,100	0.87	648,391	<b>46 7 65</b>	804,000	0.57	1,410,526
<b>46 2 27</b>	800,200	1	800,200	<b>46 7 66</b>	827,400	0.75	1,103,200
<b>46 2 30</b>	603,600	0.95	635,368	<b>46 7 67</b>	865,800	0.47	1,842,128
<b>46 3 C</b>	734,300	1.28	573,672	<b>46 7 68</b>	745,500	0.65	1,146,923
<b>46 4 36</b>	678,000	0.8	847,500	<b>46 7 71</b>	925,600	0.6	1,542,667
<b>46 6 55</b>	671,100	0.8	838,875	<b>46 8 14</b>	924,200	1.31	705,496

<b>Deltaville (Inland)</b>							
<b>Map #</b>	<b>Value</b>	<b>actual acre</b>	<b>calculated 1 acre value</b>	<b>Map #</b>	<b>Value</b>	<b>actual acre</b>	<b>calculated 1 acre value</b>
<b>40 102 1</b>	197,600	1.43	138,182	<b>45 2D</b>	37,100	1.53	24,248
<b>40 243</b>	201,100	0.806	249,504	<b>45 2F</b>	37,000	1.499	24,683
<b>40 248A</b>	194,900	1.1	177,182	<b>45 9 1</b>	146,600	0.97	151,134
<b>40 367A</b>	208,700	1	208,700	<b>45 9 2</b>	188,200	0.94	200,213
<b>40 367B</b>	40,000	0.89	44,944	<b>45 9 3</b>	158,700	0.91	174,396
<b>40 367C</b>	194,400	0.966	201,242	<b>40 367E</b>	171,700	2.46	69,797
<b>40 52 A A</b>	189,500	2.537	74,695	<b>40 73 1</b>	42,200	1.54	27,403
<b>40 73 3</b>	109,300	0.878	124,487	<b>40 246</b>	465,600	3.637	128,018
<b>40 73 4</b>	42,500	1.637	25,962	<b>40 122 1</b>	256,400	2.417	106,082
<b>40 76 B</b>	207,200	1.33	155,789	<b>40 122 2</b>	142,200	3.421	41,567
<b>40 76 C</b>	237,500	1.866	127,278	<b>40 55 1</b>	146,900	1.775	82,761
<b>40 85 1</b>	174,800	1.228	142,345	<b>40 55 3</b>	109,900	0.898	122,383
<b>40 85 2</b>	161,700	1.25	129,360	<b>40 55 3B</b>	137,800	0.7205	191,256
<b>45 12</b>	77,300	0.81	95,432	<b>40 102 2</b>	179,800	1.651	108,904
<b>45 1A</b>	35,000	0.989	35,389	<b>40 243A</b>	150,500	0.887	169,673

<b>Water View (Waterfront)</b>							
<b>Map #</b>	<b>Value</b>	<b>actual acre</b>	<b>calculated 1 acre value</b>	<b>Map #</b>	<b>Value</b>	<b>actual acre</b>	<b>calculated 1 acre value</b>
<b>9 11 12</b>	607,600	1.1	552,364	<b>9 7 1</b>	929,200	3.7	251,135
<b>9 2 10</b>	269,100	2.91	92,474	<b>9A 1 2</b>	617,100	0.67	921,045
<b>9 2 4</b>	720,700	1.6	450,438	<b>9A 1 3</b>	425,900	0.9	473,222
<b>9 2 4A</b>	276,000	1.42	194,366	<b>9A 1 5</b>	290,400	0.6	484,000
<b>9 2 5</b>	700,900	2.01	348,706	<b>9A 1 7A</b>	30,700	0.19	161,579
<b>9 2 6</b>	529,100	1.9	278,474	<b>9A 1 8</b>	266,400	0.398	669,347
<b>9 2 7</b>	520,900	1.81	287,790	<b>9A 1 9A</b>	127,500	0.17	750,000
<b>9 2 8</b>	538,500	1.29	417,442	<b>9A 3 3</b>	329,700	0.6	549,500
<b>9 2 9</b>	522,600	1.68	311,071	<b>9A 3 4</b>	287,000	0.6	478,333
<b>9 2 9A</b>	435,600	1.69	257,751	<b>9A 3 5</b>	360,000	0.65	553,846
<b>9 2 A</b>	3,400	0.128	26,563	<b>9A 3 6</b>	298,500	0.6	497,500
<b>9 46</b>	152,500	0.86	177,326	<b>9A 3 7</b>	294,700	0.6	491,167
<b>9 53</b>	940,300	3.84	244,870	<b>9A 6 1</b>	250,500	0.6	417,500
<b>9 54</b>	502,900	2.09	240,622	<b>9A 6 2</b>	32,700	0.6	54,500
<b>9 55B</b>	731,300	2.09	349,904	<b>9A 6 3</b>	339,000	0.6	565,000

<b>Water View (Inland)</b>							
<b>Map #</b>	<b>Value</b>	<b>actual acre</b>	<b>calculated 1 acre value</b>	<b>Map #</b>	<b>Value</b>	<b>actual acre</b>	<b>calculated 1 acre value</b>
<b>9 3 1</b>	158,100	1	158,100	<b>9 9 1</b>	168,100	1.0298	163,236
<b>9 3 1A</b>	105,800	0.998	106,012	<b>9 9 2</b>	40,700	0.9688	42,011
<b>9 3 2</b>	106,700	1.4	76,214	<b>9 11</b>	148,600	0.5	297,200
<b>9 3 2A</b>	166,600	0.882	188,889	<b>9 13</b>	69,800	0.72	96,944
<b>9 3 2B</b>	147,900	0.6	246,500	<b>9 14</b>	24,600	1	24,600
<b>9 3 3</b>	206,200	1.571	131,254	<b>9 15B</b>	20,000	0.991	20,182
<b>9 3 3A</b>	212,200	1.217	174,363	<b>9 25</b>	324,700	10	32,470
<b>9 3 3B</b>	106,100	0.529	200,567	<b>9 27</b>	57,400	1	57,400
<b>9 35</b>	116,200	1.0114	114,890	<b>9 27A</b>	135,700	0.6039	224,706
<b>9 4 2</b>	148,200	2.8	52,929	<b>9 30A</b>	177,300	1.809	98,010
<b>9 41</b>	27,800	1.1172	24,884	<b>9 4 1</b>	32,200	2.8	11,500
<b>9 42B</b>	177,300	1.499	118,279	<b>9 4 2</b>	148,200	2.8	52,929
<b>9 43A</b>	139,300	3.068	45,404	<b>9 4 3</b>	32,200	2.8	11,500
<b>9 48</b>	198,700	3	66,233	<b>9 6</b>	25,800	1.16	22,241
<b>9 8 9</b>	198,100	2.773	71,439	<b>8 43B</b>	96,000	1.083	88,643

<b>Urbanna (Waterfront)</b>							
<b>Map #</b>	<b>Value</b>	<b>actual acre</b>	<b>calculated 1 acre value</b>	<b>Map #</b>	<b>Value</b>	<b>actual acre</b>	<b>calculated 1 acre value</b>
<b>20A 1 116</b>	493,400	1.51	326,755	<b>20A 2 15</b>	423,100	0.5	846,200
<b>20A 1121A</b>	310,600	0.2227	1,394,701	<b>20A 2 23</b>	811,000	1.26	643,651
<b>20A 1 122</b>	382,100	1.029	371,331	<b>20A 2 29A</b>	11,100	0.19	58,421
<b>20A 1 13</b>	287,300	0.4	718,250	<b>20A 2 32</b>	482,200	0.75	642,933
<b>20A 1 22D</b>	157,700	0.38	415,000	<b>20A 2 4</b>	379,600	0.15	2,530,667
<b>20A 1 75A</b>	156,900	0.33	475,455	<b>20A 2 6</b>	437,800	0.23	1,903,478
<b>20A 1 78</b>	383,100	0.58	660,517	<b>20A 2 8</b>	513,500	0.39	1,316,667
<b>20A 1 81</b>	524,100	0.69	759,565	<b>20A 2 A</b>	652,900	2.5191	259,180
<b>20A 1 83</b>	60,000	0.296	202,703	<b>20A 20 9</b>	521,000	0.366	1,423,497
<b>20A 1 87</b>	640,600	0.35	1,830,286	<b>20A 28 4</b>	290,700	0.58	501,207
<b>20A 10 1</b>	278,600	0.43	647,907	<b>20A 30 10</b>	834,200	0.36	2,317,222
<b>20A 10 2</b>	346,400	0.37	936,216	<b>20A 6 25</b>	728,800	0.3	2,429,333
<b>20A 10 3</b>	524,200	0.4	1,310,500	<b>20A 6 27</b>	509,600	0.24	2,123,333
<b>20A 15 G2</b>	881,200	1.63	540,613	<b>20A 9 1</b>	690,100	0.4	1,725,250
<b>20A 2 11</b>	473,300	0.45	1,051,778	<b>20A 9 2</b>	533,800	0.38	1,404,737

<b>Urbanna (Inland)</b>							
<b>Map #</b>	<b>Value</b>	<b>actual acre</b>	<b>calculated 1 acre value</b>	<b>Map #</b>	<b>Value</b>	<b>actual acre</b>	<b>calculated 1 acre value</b>
<b>20A 29 1</b>	205,200	0.395	519,494	<b>20A 8 B</b>	192,000	0.2533	757,994
<b>20A 29 2</b>	254,900	0.3807	669,556	<b>20A 6 54</b>	152,300	0.53	287,358
<b>20A 29 3</b>	153,200	0.365	419,726	<b>20A 7 B</b>	152,900	0.266	574,812
<b>20A 29 4</b>	191,800	0.4	479,500	<b>20A 1 2A</b>	146,000	0.298	489,933
<b>20A 29 5</b>	240,600	0.4	601,500	<b>20A 13 1</b>	129,100	0.226	571,239
<b>20A 29 10</b>	208,900	0.3	696,333	<b>20A 25 3</b>	161,000	0.475	338,947
<b>20A 29 9</b>	158,300	0.3444	459,640	<b>20A 1 5</b>	136,900	0.205	667,805
<b>20A 29 8</b>	212,900	0.35	608,286	<b>20A 1 27</b>	382,000	0.547	698,355
<b>20A 29 7</b>	163,900	0.345	475,072	<b>20A 1 27A</b>	123,200	0.2925	421,197
<b>20A 29 6</b>	204,400	0.35	584,000	<b>20A 1 26</b>	198,500	0.389	510,283
<b>20A 6 67</b>	187,500	0.223	840,807	<b>20A 1 22A</b>	60,000	0.321	186,916
<b>20A 6 69</b>	160,300	0.228	703,070	<b>20A 33 17</b>	194,800	0.409	476,284
<b>20A 6 77</b>	156,700	0.172	911,047	<b>20A 33 16</b>	175,500	0.41	428,049
<b>20A 7 A</b>	195,600	0.335	583,881	<b>20A 33 15</b>	198,000	0.4068	486,726
<b>20A 6 61</b>	193,900	0.2912	665,865	<b>20A 33 19</b>	213,900	0.3788	564,678